

Appl. No. 10/828,592
Reply to Examiner's Action dated August 26, 2005

REMARKS/ARGUMENTS

The Applicants have carefully considered this application in connection with the Examiner's Action and respectfully request reconsideration of this application in view of the following remarks.

The Applicants originally submitted Claims 1-20 in the application. In a previous response to an Election Requirement, the Applicants elected Group II, constituting Claims 1-10 and 16-20. Presently, the Applicants have not amended, cancelled nor added any claims. Accordingly, Claims 1-10 and 16-20 are currently pending in the application.

I. Rejection of Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103

The Examiner has rejected Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,750,133 to Datta ("Datta") in view of U.S. Patent No. 5,814,238 to Ashby, *et al.* ("Ashby"). Independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. Neither Datta nor Ashby alone teaches or suggests this claimed element.

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Datta is directed to selective ball-limiting metallurgy etching process for fabrication of electroplated tin bumps. (Title) Datta teaches that a metal first layer 26 located below a copper stud 34 is subjected to an etch process. Datta does not disclose, however, that the etch process is a dry etch selective to the barrier layer, as is currently claimed. Further, Datta does not recognize the problems conventional wet etches tend to cause with barrier layers in the manufacture of interconnects.

To the contrary, Ashby is directed to a method for dry etching of transition metals. (Title). Ashby does not disclose, however, that its dry etch process could or should be used to etch a portion of a barrier layer extending beyond a surface of a surface conductive lead in an interconnect, as is currently claimed. Moreover, Ashby does not recognize the benefits of using a dry etch, and thus the problems conventional wet etches tend to cause, with barrier layers in the manufacture of interconnects.

No motivation exists in Datta, Ashby or elsewhere to combine the dry etch of Ashby with the manufacturing process of Datta. In combining Datta with Ashby, the Examiner has done nothing more than use hindsight to reconstruct the presently claimed invention. Specifically, the Examiner has taken individual elements of the presently claimed invention and gone out and found those elements in various different references, and without any motivation in either of the references, declared that it would be obvious to combine the references.

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In reality, no motivation exists to combine Data with Ashby, and moreover, the Examiner has not offered any evidence, except for the general proposition that it would be obvious, that a motivation to combine the references does actually exist. Because the Examiner has failed to provide any plausible motivation why one skilled in the art would combine the references, and more specifically the dry etch of Ashby with the manufacturing process of Datta, the Examiner is clearly using hindsight.

Thus, Datta, individually or in combination with Ashby, fails to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. The combination must therefore fail to establish a prima facie case of obviousness with respect to these claims. Claims 1-6, 10, 16 and 20 are therefore not obvious in view of Datta and Ashby.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 1-6, 10, 16 and 20 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

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II. Rejection of Claims 7, 8, 17 and 18 under 35 U.S.C. §103

The Examiner has rejected Claims 7, 8, 17 and 18 under 35 U.S.C. §103(a) as being unpatentable over Datta in view of Ashby and further in view of U.S. Patent No. 4,849,124 to Backus ("Backus"). As previously indicated, independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. As established above, neither Datta nor Ashby teaches or suggests this claimed element.

Similarly, Backus fails to teach or suggest this claimed element. The Examiner is offering Backus for the sole proposition of etching copper using an etch chemistry including hydrogen peroxide and sulfuric acid. Without even addressing whether the Examiner's proposition is accurate, a teaching or suggestion of etching copper using an etch chemistry including hydrogen peroxide and sulfuric acid is entirely different from a teaching or suggestion of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer, as is currently claimed. Accordingly, Backus also fails to teach or suggest this claimed element.

Thus, Datta, individually or in combination with Ashby and/or Backus, fails to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. The combination must therefore fail to establish a prima facie case of obviousness with respect to these claims. Claims 7, 8, 17 and 18 are therefore not obvious in view of the combination.

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In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 7, 8, 17 and 18 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

III. Rejection of Claims 9 and 19 under 35 U.S.C. §103

The Examiner has rejected Claims 9 and 19 under 35 U.S.C. §103(a) as being unpatentable over Datta in view of Ashby and further in view of U.S. Patent No. 6,569,752 to Homma, *et al.* ("Homma"). As previously indicated, independent Claims 1 and 16 currently include the element of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer. As established above, neither Datta nor Ashby teaches or suggests this claimed element.

Similarly, Homma fails to teach or suggest this claimed element. The Examiner is offering Homma for the sole proposition of a surface conductive lead having a width of about 100 μm . Without even addressing whether the Examiner's proposition is accurate, a teaching or suggestion of a surface conductive lead having a width of about 100 μm is entirely different from a teaching or suggestion of subjecting a portion of a barrier layer extending beyond a surface of a surface conductive lead to a dry etch to remove the portion, the dry etch being selective to the barrier layer, as is currently claimed. Accordingly, Homma also fails to teach or suggest this claimed element.

Thus, Datta, individually or in combination with Ashby and/or Homma, fails to teach or suggest the invention recited in independent Claims 1 and 16 and their dependent claims, when considered as a whole. The combination must therefore fail to establish a *prima facie* case of

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obviousness with respect to these claims. Claims 9 and 19 are therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 9 and 19 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

IV. Prior Art Made of Record

The Applicants believe that the prior art made of record and not relied upon by the Examiner is not particularly pertinent to the claimed invention, but the Applicants retain the right to address these references in detail, if necessary, in the future.

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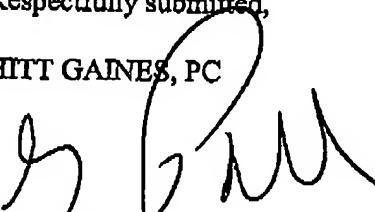
V. Conclusion

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-10 and 16-20.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application. The Commissioner is hereby authorized to charge any fees, credits or overpayments to Deposit Account 20-0668.

Respectfully submitted,

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